

the display, each selectable region adjacent a side of the polygon and one or more of the selectable regions associated respectively with a sequence of one or more characters, the plurality of selectable regions together at least partially circumscribing a region on the display;

(b) a voice output device [speech synthesizer]; and

(c) control means for:

- B1 could
- (1) receiving a movement related signal and moving a cursor within the polygon responsive to the movement related signal;
  - (2) [repetitively,] in response to a succession of selection events, each associated respectively with [and] an intersection of the cursor and one of the selectable regions associated with one of the one or more sequences of one or more letters, appending the sequence associated with the intersected selectable region to at least one previously selected sequence; and
  - (3) speaking, by means of the voice output device [speech synthesizer], the word spelled by the appended sequences.

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80. (once amended) A method of speaking using a voice output [speech synthesis] system including a display and a voice output device [speech synthesizer], said method comprising the steps of:

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displaying a plurality of selectable regions within a polygon on the display, each selectable region adjacent a side of the polygon and one or more of the selectable regions associated respectively with a sequence of one or more characters, the plurality of selectable regions together at least partially circumscribing a region on the display;

receiving a movement related signal and moving at least part of a cursor only within the polygon responsive to the movement related signal;

repetitively:

- (i) in response to a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the durations of one or more successive periods of intersection of the cursor and one of the one or more selectable regions, selecting

the sequence associated with the intersected selectable region; and

(ii) appending the selected sequence to at least one previously selected sequence; and

speaking, by means of the voice output device [speech synthesizer], the word spelled by the appended sequences.

*B2 could*

Sub C4 90. The apparatus of claim 1 wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of the duration of a period of intersection of two of the successive locations and one of the selectable regions; and wherein the selection means further includes means for indicating the remaining dwell time required to select the menu option associated with the intersected selectable region.

*B3 voice cont*

91. The apparatus of claim 90 wherein the menu option associated with the intersected selectable region represents a sequence of one or more words; and further comprising a voice output device for speaking the sequence of one or more words responsive to the selection means selecting the menu option associated with the intersected selectable region.

92. The apparatus of claim 90 wherein the menu option associated with the intersected selectable region is associated with a submenu comprising a plurality of submenu options each associated respectively with one of the selectable regions; and wherein the selection means is further operative to select, responsive to a second dwell event, the submenu option associated with the selectable region associated with the second dwell event.

*Sub C5*

93. The apparatus of claim 90 further comprising a plurality of selectable regions on the display area, each associated respectively with one of the selectable regions outside the display area; wherein the first quantity is further a function of the duration of a period of intersection of two of the successive locations and one of the selectable regions on the display area; and wherein the selection means is further operative to select the menu option associated with the selectable region outside the display area associated with the intersect selectable region on the display area.

94. A voice output system for an operator having impaired motor control, said voice output system comprising:

- (a) a display area;
- (b) means for delimiting an invisible selectable region outside the display area associated with a sequence of one or more words;
- (c) a voice output device;
- (d) movement related signal receiving means for receiving a movement related signal indicating successive locations with respect to the display area; and
- (d) selection means, responsive to a first dwell event associated with the selectable region outside the display area, for selecting the selectable region;

whereby the operator may select the selectable region outside the display and speak, with the voice output device, the sequence of one or more words.

95. The apparatus of claim 1 wherein one of the selectable regions is invisible.

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96. The apparatus of claim 95 wherein the menu option associated with the invisible selectable region is associated with a submenu comprising a plurality of submenu options each associated respectively with one of the selectable regions; wherein the first dwell event is associated with the invisible selectable region; and wherein the selection means is further operative to select, responsive to a second dwell event, the submenu option associated with the selectable region associated with the second dwell event.

97. The apparatus of claim 95 further comprising a plurality of selectable regions on the display area, each associated respectively with one of the selectable regions outside the display area; and wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:

- (a) the durations of one or more successive periods of intersection of two or more of the successive locations and one of the selectable regions on the display area; and
- (b) the durations of one or more successive periods of intersection of two or more of the successive locations and the invisible selectable region.

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98. The apparatus of claim 6 wherein the menu option associated with the intersected selectable

region represents a sequence of one or more words; and further comprising a voice output device for speaking the sequence of one or more words responsive to the selection means selecting the menu option associated with the intersected selectable region.

99. The apparatus of claim 6 further comprising a plurality of selectable regions on the display area, each associated respectively with one of the selectable regions outside the display area; and wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:
- (a) the durations of one or more successive periods of intersection of two or more of the successive locations and one of the selectable regions on the display area; and
  - (b) the durations of one or more successive periods of intersection of two or more of the successive locations and the selectable region outside the display area associated with the intersected selectable region on the display area.
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100. The apparatus of claim 6 further comprising signal generating means coupled to a device for generating a device control signal corresponding to a device control function; wherein the selected menu option represents the device control function; and wherein the signal generating means, in response to the first dwell event, generates the device control signal represented by the selected menu option.
101. The apparatus of claim 86 wherein the selected menu option represents a sequence of one or more words; and further comprising a voice output device for speaking the sequence of one or more words responsive to the selection means selecting the selected menu option.
102. The apparatus of claim 86 further comprising a plurality of selectable regions outside the surface, each associated respectively with one of the selectable regions on the surface; and wherein the first dwell event includes a first quantity equalling or exceeding a predetermined quantity, the first quantity being a function of:
- (a) the durations of one or more successive periods of intersection of two or more of the successive locations and one of the selectable regions on the surface; and
  - (b) the durations of one or more successive periods of intersection of two or more of the successive locations and the selectable region outside the surface associated with the

intersected selectable region on the surface.

103. The apparatus of claim 86 further comprising signal generating means coupled to a device for generating a device control signal corresponding to a device control function; wherein the selected menu option represents the device control function; and wherein the signal generating means, in response to the dwell event, generates the device control signal represented by the selected menu option.

*Sub C7  
plurality  
encountered*

104. The apparatus of claim 73 wherein the movement related signal is responsive to the head movement of the operator; wherein each of the plurality of selectable regions is adjacent an edge of the display; wherein each of the succession of selection events includes a plurality of periods of intersection of the cursor and the intersected selectable region, each of the plurality of periods of intersection having a total duration equalling or exceeding a predetermined period; and wherein the selection means further includes means for indicating the difference between the predetermined period and the total duration of the plurality of periods.

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105. The apparatus of claim 85 wherein the sensor signal is responsive to a sound.

*Sub C8 over*

106. In voice output system for an operator having impaired motor capability, an apparatus for selecting a menu option associated with an overshoot selectable subregion on a display, said apparatus comprising:

- (a) a voice output device;
- (b) the display;
- (c) a menu comprising a plurality of menu options, each associated respectively with a sequence of one or more letters; and
- (d) control means for:
  - (1) delimiting a plurality of selectable regions, each of the selectable regions associated respectively with one of the plurality of menu options, and each of the selectable regions including a subregion adjacent the display and a subregion on the display, the subregion adjacent the display and the subregion on the display adjacent one another, the plurality of the subregions on the display together at least partially circumscribing a region on the display;